**STEM Education**

STEM education is an approach to teaching and learning that integrates the content and skills of science, technology, engineering, and mathematics. STEM Standards of Practice guide STEM instruction by defining the combination of behaviors, integrated with STEM content, which is expected of a proficient STEM student. These behaviors include engagement in inquiry, logical reasoning, collaboration, and investigation. The goal of STEM education is to prepare students for post-secondary study and the 21st century workforce.

**STEM Centric Lesson and Unit Checklist Overview**

The STEM Centric Lesson and Unit Checklist was created to provide support for educators in the development or modification of lessons and units. A STEM centric lesson or unit incorporates the STEM Standards of Practice and reflects the definition of STEM education. The attached checklist describes four components to consider when developing or modifying a lesson or unit – content standards and the STEM Standards of Practice, real world connection, development of deep conceptual understandings, and diverse learners. Each component contains criteria represented in a fully developed STEM centric lesson or unit. Criterion should only be checked if the lesson or unit contains evidence of the criterions’ descriptor. All criteria should be checked in a fully developed STEM centric lesson or unit.

**Using the STEM Centric Lesson and Unit Checklist**

The STEM Centric Lesson and Unit Checklist should be used as a tool to aid in the development or modification of units and lessons to reflect the definition of STEM Education and incorporate the STEM Standards of Practice. This document should be used as a self-reflection tool and a resource to help guide STEM instruction. Further, educators can use the checklist to identify areas of improvement and sustainability in a lesson or unit. This document is not intended to be used for the purposes of teacher evaluation or a “look for” when conducting classroom visits.

Lesson or Unit Title:

Course(s):

|  |  |  |  |
| --- | --- | --- | --- |
| **Content Standards and the STEM Standards of Practice** | **Real World Connection** | **Development of Deep Conceptual Understandings** | **Diverse Learners** |
| *The lesson or unit:*  Aligns to a target set of rigorous course content standards.  Identify content standards below:  Aligns to the STEM Standards of Practice.  Identify Practices below:  Integrates content standards from science, technology, engineering, or mathematics courses as appropriate to address the real world connection.  Identify standards below:  Focuses teaching and learning on developing content mastery and STEM proficiency. | *The lesson or unit:*  Presents the real world connection in the form of a complex question, global issue, challenge, or problem.  Provides opportunities for students to apply content knowledge from multiple courses as appropriate to answer complex questions, to investigate global issues, or to develop solutions for challenges and real world problems.  Provides opportunities for students to develop or use a systematic approach (e.g.: engineering design process, scientific and engineering practices) to investigate and develop solutions or answers to the real world connection.  Provides opportunities for students to understand the relationship between the real world connection, course content, and the work performed by STEM professionals. | *The lesson or unit:*  Requires students to employ higher order thinking skills in the application of content knowledge.  Provides opportunities for students to adapt or extend concepts, activities, or projects to enhance their understanding.  Provides opportunities for students to develop understanding of content through questioning, problem solving, collaboration, and hands-on activities.  Provides opportunities for students to demonstrate their understanding of content and the application of the STEM Standards of Practice independently (this check box is for a unit containing multiple lessons). | *The lesson or unit incorporates the following as appropriate to meet the needs of diverse learners:*  Universal Design for Learning Principals <http://marylandlearninglinks.org/950>  WIDA Performance Definitions and CAN DO Descriptors <http://www.wida.us/standards/CAN_DOs/>  Accelerations or enhancements for gifted and talented students. |

**Note about assessments**: Assessments should be given regularly throughout a lesson or unit to collect evidence of student learning and raise the quality of teaching. Assessments should be varied, aligned to instructional outcomes, designed to measure progress towards mastery of content and STEM proficiency, and include rubric-based performance tasks that are relevant to the real world of work. The unit or lesson should provide students multiple opportunities to demonstrate mastery of content and STEM proficiency.

**Works Consulted:**

Danielson, C. *Enhancing Professional Practice, A Framework for Teaching*. Association for Supervision & Curriculum

Development, 2009.

Rowley, James, and Margy Stevens. *STEMed Quality Framework*. The Dayton Regional STEM Center, 2011. Web. Sep 2011. <http://www.daytonregionalstemcenter.org/uploads/documents/Final Framework copyrighted.pdf>.

*Teacher and Principal Practice Rubrics* . NYSED.gov, 2011. Web. Feb 2012.

<http://usny.nysed.gov/rttt/teachers-leaders/practicerubrics/>.

*Tri-State Quality Review Rubric.* Engage NY. Web. April 2012. <http://engageny.org/resource/tri-state-quality-review-rubric-and-rating-

process/>